4.2.1.5 Geology and Soils

Construction and operation of the alternatives at Hanford would have no effect on the geologic resources. A low seismic risk exists, but would be considered in the design of the proposed alternatives. The existing seismic risk does not preclude the safe construction and operation of the proposed alternative facilities. The facilities would be designed for earthquake-generated ground accelerations in accordance with DOE O 420.1, *Facility Safety.* Intensities of approximately V to VII on the MMI scale are possible in the general region. This could affect the integrity of poorly designed or nonreinforced structures, but should not affect newly designed facilities. Human health effects from accidents initiated by natural phenomenon (for example, earthquakes) are discussed in Section 4.2.1.9. A volcanic event of the Mt. St. Helens type could occur in the Cascade Mountain region to the west, resulting in a possible ashfall at Hanford. A recurrence of a similar event would not have an effect on the construction and operation of any of the proposed storage alternatives. It is highly unlikely that landslides, sinkhole development, or other nontectonic events would affect project activities. Slopes and underlying foundation materials are generally considered stable. Geologic resources at Hanford consist of crushed rock, sand, and gravel that have low economic value. New construction may increase the use of these materials; however, because large volumes of these materials are present, the impact is anticipated to be negligible.

Impacts to the geologic and soil resource occur during, or as a result of, ground-disturbing construction activities. Construction of the alternatives may involve ground disturbing activities that could affect the soil resources. The amount of land disturbed is specified below for each alternative. Impacts would depend on the specific soil units in the disturbed area, the extent of land disturbing activities, and the amount of soil disturbed. Control measures would be employed during construction activities to minimize soil erosion. [Text deleted.]

[Text deleted.]

Preferred Alternative: No Action Alternative

Under the No Action Alternative, DOE would continue current and ongoing activities at Hanford. There would be no ground-disturbing activities beyond those associated with existing and future site improvements. Because neither new construction nor the associated ground disturbance for potential soil erosion would occur, the No Action Alternative would have no effect on the geologic or soil resources at the site.

Upgrade Alternative

Upgrade Without Rocky Flats Environmental Technology Site Plutonium or Los Alamos National Laboratory Plutonium Subalternative

Modify Existing Fuels and Materials Examination Facility for Plutonium Storage

No apparent direct or indirect effects on the geologic resources are anticipated because neither facility construction and operational activities nor site infrastructure improvements will limit access to potential geologic resources. Design of the facilities would preclude potential impacts by any potential hazardous geological conditions.

Construction activities will occur completely within FMEF protected area, using existing gravel areas for construction laydown. Modification of the existing FMEF for Pu storage may disturb as much as 6.3 ha (15.5 acres) from construction activities, which would affect the soil profile and lead to a possible increase in soil erosion as s result of stormwater runoff and wind action. Soil impacts during operation are expected to be minimal.

Construct New 200 West Area Facility for Plutonium Storage

No apparent direct or indirect effects on the geologic resource are anticipated because neither facility construction and operational activities nor site infrastructure improvements will limit access to potential geologic resources. Design of the facilities would preclude potential impacts by any potential hazardous geological conditions.

Construction activities will occur completely within PFP protected area and use existing gravel areas for construction laydown. Construction of the new Pu storage facility will involve ground-disturbing construction activities (approximately 10.5 ha [26 acres]) that will affect the soil profile and potentially cause a temporary increase in soil erosion. Construction activities (foundation preparation) and associated building construction laydown areas can expose the soil profile and lead to a possible increase in soil erosion as a result of wind and water action. Soil loss would depend on the frequency and severity of rain, wind velocities (increases in wind velocities and durations increase potential soil erosion), and the size, location, and duration of ground-disturbing activities.

Net soil disturbance during operations would be considerably less than during construction because areas temporarily used for construction laydown would be restored. Although stormwater runoff and wind action could occur during operation, they are anticipated to be minimal. [Text deleted.]

Upgrade With All or Some Rocky Flats Environmental Technology Site Plutonium and Los Alamos National Laboratory Plutonium Subalternative

Modify Existing Fuels and Materials Examination Facility for Plutonium Storage

The construction and operation land-use requirements to modify the FMEF are not affected by the inclusion of RFETS and LANL Pu material. Therefore, the impacts would be similar to those discussed for the modify FMEF without RFETS or LANL Pu material.

Construct New 200 West Area Facility for Plutonium Storage

The construction and operation land use requirements for the new Hanford Pu storage facility are not affected by the inclusion or exclusion of RFETS and LANL Pu material. Therefore, the impacts would be similar to those discussed for the new 200 West Area Pu storage facility without RFETS or LANL Pu material.

Consolidation Alternative

Construct New Plutonium Storage Facility

Construction of the new Pu storage facility will occur completely on previously undisturbed land as defined by Section 4.1.1 in a location west of the 200 East Area. Implementation of the Consolidation Alternative will involve ground-disturbing activities (58.5 ha [144 acres]) that will affect the soil profile and potentially cause a temporary increase in soil erosion. No apparent direct or indirect effects on the geologic resource are anticipated because neither facility construction and operational activities nor site infrastructure improvements will limit access to potential geologic resources. Analysis in this section is the same as that provided for the new 200 West Area Pu storage facility without RFETS or LANL Pu material.

Collocation Alternative

Construct New Plutonium and Highly Enriched Uranium Storage Facilities

Construction and operation effects on geologic and soil resources for the Collocation Alternative would be similar to those described for the Consolidation Alternative. However, additional soil impacts would be expected. Construction activities would occur completely on undisturbed land (west of the 200 East Area) as defined by Section 4.1.1 and involve approximately 89.5 ha (221 acres) of land disturbance for the new facilities, affecting the soil profile and leading to a possible temporary increase in erosion as a result of stormwater runoff and wind action. Soil impacts during operation are expected to be minimal.

No apparent direct or indirect effects on the geologic resource are anticipated, because neither facility construction and operational activities nor site infrastructure improvements will restrict access to potential geologic resources.

Subalternative Not Including Strategic Reserve and Weapons Research and Development Materials

Exclusion of strategic reserve and weapons R&D materials would give almost the same effects to the geologic and soil resources for the Pu Subalternative, the Consolidation Alternative, and the Collocation Alternative. By excluding these materials, the size of a facility would be similar, thus not changing the amount of land disturbed by construction activities. No effect to the geologic resource is anticipated as a result of this subalternative. [Text deleted.]

Phaseout

The phaseout of storage capacity would have no apparent effects on the geologic resources. However, phaseout could result in beneficial effects on the soils of the area. Hazardous, radioactive, and mixed waste sources would be eliminated from the area, thus decreasing the potential for future soil contamination.

[Text deleted.]